REMARKS/ARGUMENTS

In the Office Action dated June 26, 2005, the Examiner issued a Final action in this application, rejecting all of the claims, claims 2-24, in the application. Noting that Applicant's arguments were not found convincing, he maintained the rejection of claims 2-10, 16, 17 and 22-24 based on Funke et al (6,051,517 under 35 U.S.C. 102(e); he also maintained the rejection of claims 14 and 15 based on Funke et al. under 35 U.S.C. 103(a). Lastly, he maintained the rejection of Claims 11-13 and 18-21 based on Funke et al. in view of Levy (5,789,024) under 35 U.S. C. 103(a)

Claims 2-24 remain in this application. Independent claims 4, 16, 18, and 22 have now been amended to more distinctly recite Applicants' discovery that a process for controlling the ultimate pore size of a ceramic inorganic membrane having a matrix of material particles of an inorganic compound selected from the group consisting of metal oxides, metal nitrides, and metal carbides could readily be achieved by depositing one monolayer at a time of a selected inorganic compound under claimed conditions within the pores or interstices between the particles that make up on the matrix material particles. Thus, applicants' method, as now claimed, deposits the one monolayer at a time of a selected inorganic compound on the surface of the particles which make up the pore walls of the matrix that makes up the ceramic inorganic membrane, as contrasted with prior art methods that deposit one or more layers on the outside surfaces of the zeolite membrane and not within the pores of the zeolite crystallographic structure.

Concerning more particularly the rejections made by the Examiner, he noted that while Applicants had argued that the zeolite membrane of Funke et al. has a different pore structure than the oxide, nitride, and/or carbide ceramic membranes of the present invention, these alleged differences were not claimed. He further noted that Funke et al. teaches that the zeolite is alumina silicate and this reads on being a ceramic membrane, which is all that the claims require and the approach Applicants use in solving the problem of reducing pore size does not carry patentable weight when Funke anticipates each and every limitation of the claim. He concluded that because the arguments have not been found to be convincing the rejections based on Funke are maintained.

Applicants note with appreciation that the Examiner has withdrawn the rejections based on Levy et al. or McMillian et al. as primary references. The rejections, however, based on Funke were still applicable as further given in the Office Action.

The Examiner rejected claims 2-10, 16, 17, and 22-24 under 35 U.S. C. 102(e) as being clearly anticipated by Funke et al., noting that the claimed process is disclosed at col.4, lines 20-50, col. 4, lines 60-68, col. 7, lines 10-15, 25-30, and 60-65, col. 8, lines 30-45, col.9, lines 1-3 and 35-50, col. 10, lines 21-55 and col. 11, lines 34-38. He further notes

that the pore sizes disclosed in the examples after deposition of the layers are in the claimed ranges.

This rejection is respectfully traversed. Applicants have now amended their independent claims 4, 16, and 22 which are included within the rejected claims to more particularly include the novel features of their invention; namely, that the depositing of the at least one monolayer of a selected inorganic compound is within (i.e., on the surface of the pore walls) the matrix of material particles which make up the ceramic inorganic membrane. A careful review of the referenced sections of the Funke et al. patent teach that the monomolecular layer is deposited on the zeolite surfaces. See in particular the Specification at col. 4, lines 33-37 where "...a monomolecular layer 20 [is] deposited on the top surfaces 14 and side surfaces 16,18 of the crystal to modify...." Also, and more specifically in Fig. 1 where there is shown the referenced top surfaces (14) and side surfaces (16 and 18) and even the bottom surface 12 of the modified zeolite membranes or other crystalline membranes.

Thus, while the specification and drawings show a modified zeolite structure having pores therein, none show the monolayer being deposited within the pores of the zeolite structure. See also col. 7, lines 60-65, cited by the Examiner where the patentee expressly discloses that the volatile molecule reacts with the surface hydroxyl sites 30 on the exposed surfaces 14, 16, 18 of the zeolite crystals. See also col. 9, lines 27-29 where the patentee discloses that the monomolecular layer is deposited "around and over the pore openings 24 in the crystals." Nowhere does the patentee hint or suggest how to achieve a process for controlling the ultimate size of a fine-pored ceramic inorganic membrane having a matrix of material particles of an inorganic compound including pores with pore walls therein by depositing one monolayer at a time of an inorganic compound, e.g., metal oxides, metal carbides, and metal nitrides, uniformly on the surface of the particles which make up the pore walls of the pores of the matrix.

For the same reasons given above for the rejected independent claims, this rejection is also respectfully traversed for dependent claims 2, 3, 5-15, 17, 19-21, 23, and 24. Thus, contrary to the Examiner's assertion that Funke et al. "anticipates each and every limitation of the claim" Applicants submit that this simply is not the case when applied to Applicants' now amended claims.

The PTO and courts have required for §102 anticipation that a single reference must teach (i.e., identically describe) each and every material element or step of the rejected claim. It is submitted that the rejection of Applicants' claimed invention as being clearly anticipated under 35 U.S.C. §102(e) by the Funke et al. patent fails to satisfy this requirement. None of the material elements or steps of Applicants' rejected claims, as now amended, are found or taught by Funke et al.

Accordingly, it is respectfully requested that, in view of the claims as now amended and the above remarks, the rejection of Applicants' claims 2-10, 16, 17, and 22-24 under 35 U.S.C. 102(e) as being clearly anticipated by the cited Funke et al. reference be withdrawn.

Next, the Examiner rejected claims 14 and 15 under 35 U.S. C. 103(a) as being unpatentable over Funke et al. He states that Funke teaches the limitations of claim 4, as shown above, but does not explicitly disclose coating only one side of the membrane, such as by placing the membrane on a holder. He notes that because the purpose of the membranes disclosed in the above references is to filter material, which involves passing a medium through the membrane to allow some material to pass through based on the adjusted pore size and such passing through is only usually performed from a single direction through the filter to avoid dislodging trapped material filtered out by the membrane, it would have been obvious to coat only the inflow side of the filter to adjust the pore size thereof because that is the side at which filtration is performed and coating only one side would have the clear advantages of saving process time and cost by coating only one side as opposed to both sides.

This rejection is respectfully traversed. It is to be noted that claim 14, as now amended, is a dependent claim, depending from now independent claim 4 and claim 15 is a dependent claim from claim 14. As such these claims incorporate all of the limitations found in now independent claim 4.

In a §103(a) obviousness rejection the PTO has the initial burden of establishing a *prima facie* case and in order to meet this initial burden it must satisfy three requirements. First, the prior art relied upon, coupled with the knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify or to combine references. *In re Fine,* 837 F.2d 1071, 1074, 5 U.S.P.Q. 2d 1596, 1598 (Fed. Cir. 1988); *In re Skinner,* 2 U.S.P.Q.2d 1788 (Bd. Pat. App. 1986).

Second, the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *Amgen, Inc. v.Chugai Pharmaceutical Co.,* 927 F.2d 1200, 1209, 18 U.S.P.Q. 2d 1016, 1023 (Fed. Cir.)

Third, the prior art reference or combination of references must teach or suggest all the limitations of the claims. *In re Wilson,* 424 F.2d 1382, 1385, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970).

Additionally, the teachings or suggestions, as well as the expectation of success, must come from the prior art, not Applicants' disclosure. *In re Vaeck,* 947 F.2d 488, 493, 20 U.S.P.Q. 2d 1438, 1442 (Fed. Cir. 1991).

The Funke et al. reference disclose, as correctly noted by the Examiner, coating only one side of the membrane. In fact the method disclosed in Funke et al. coats all surfaces of the zeolite crystals, i.e., on the top, side and bottom or other surface (gap or region between the juxtaposed faces of adjacent faces of the zeolite crystals). (See Figs.1 and 5 and text at col. 6, lines 13-19 and lines 35-40). It is submitted that the method disclosed in the Funke et al. patent inherently coats all surfaces to modify the zeolite or other crystalline molecular sieves and therefore the requisite finding in the Funke et al. reference of a suggestion, incentive, or a reasonable expectation to coat only a single side of the membrane as found in the rejected claims is not found.

Absent a finding of these three requisites, all of which must come from the Funke et al. reference, the PTO has not established a *prima facie* case of obviousness and the rejection of claims 14 and 15 under 35 U.S.C. 103(a) on the Funke et al. reference must be withdrawn.

Lastly, the Examiner rejected claims 11-13, and 18-21 under 35 U.S. C. 103(a) as being unpatentable over either Funke et al. or in view of Levy et al. (U.S. 5,789,024). The Examiner stated that Funke teaches the limitations to claim 9, as shown above, but does not explicitly disclose a gamma alumina or alumina membrane. He concludes because Levy discloses that it is desirable to decrease the pore size of alumina membranes by depositing inorganic compounds thereon (col.7, line 23), it would have been obvious to have coated an alumina membrane by the process of Funke with a reasonable expectation that doing so would successfully provide an alumina membrane having an adjusted pore size to tailor its filtration properties. First, it is believed that the Examiner was in error when he referenced claim 9, which has nothing to do with limitations pertaining to gamma alumina. It is believed that the Examiner was addressing claim 11 when he recited claim 9 in his rejection.

This rejection is also respectfully traversed. As noted above, in a §103(a) obviousness rejection the PTO has the initial burden of establishing a *prima facie* case and in order to meet this initial burden it must satisfy three requirements, namely, (1) the prior art relied upon, coupled with the knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify or to combine references, (2) the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made and (3) the prior art reference or combination of references must teach or suggest all the limitations of the claims.

As discussed above, the Funke process deposits a monomolecular layer on the zeolite surfaces, i.e., top, sides, and bottom of the zeolite crystals. It does not, however, hint or suggest that the process could deposit a monomolecular layer within the pores of the zeolite crystals. If point of fact it teaches away from such an end result. See col. 9, lines 27-29 where the patentee discloses that the monomolecular layer is deposited "around and over the pore openings 24 in the crystals".

While Levy et al. discloses that it is desirable to decrease the pore size of alumina membranes, he does it by a counterflow gas method with at least two reactant gas streams to deposit via a low pressure chemical vapor deposition technique microporous film predominately of silicon oxide and optionally polysilicon, silicon carbide or silicon nitride within the walls of a mesoporous membrane substrate, such as alumina.

It is to be noted that claims 11-13 are dependent claims, depending from claim 7, which in turn is depending from independent claim 4 and as such incorporate all of the limitations found in independent claim 4, as now amended, namely reciting the limitation of depositing a selected inorganic membrane in the pore walls of matrix particles that make up the inorganic membrane. Combining these two references as the Examiner has in the present §103 rejection would not, it is submitted, give a reasonable expectation that doing so would successfully provide an alumina membrane having an adjusted pore size to tailor its filtration properties. Funke simply teaches away from the intended result and the Levy patent does not supply the deficiency.

Claim 18 is an independent claim and as now amended it contains the limitation of reacting trimethly aluminum with hydroxyls on the surface of the pore walls of alumina matrix particles and treating the alumina membrane with water vapor so that the water molecules react with any remaining methyl groups to liberate methane and to leave hydroxyl groups attached to deposited alumina. Claims 19-21 are dependent from independent claim 18 and incorporate all of the limitations found in independent claim 18.

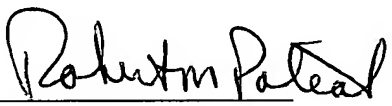
As noted for claims 11-13, combining these two references as the Examiner has in the present §103 rejection of claims 18-21 would not, it is submitted, give a reasonable expectation that doing so would successfully provide an alumina membrane having an adjusted pore size to tailor its filtration properties. Funke simply teaches away from the intended result and the Levy patent does not supply the deficiency.

Absent a finding of these three requisites, all of which must come from the Funke et al. reference, the PTO has not established a *prima facie* case of obviousness and the rejection of claims 11-13 and claims 18-21 under 35 U.S.C. 103(a) on the Funke et al. in view of Levy et al. references must be withdrawn.

Accordingly, it is respectfully requested that, in view of the claims as now amended and the above remarks, the rejection of Applicant's claims 11-13 and 18-21 under 35 U.S.C. 103(a) as being unpatentable over either Funke et al. in view of Levy et al. references be withdrawn.

In view of the above amendments to claims 2-24 and remarks, this application is now believed to be in condition for allowance which action by the Examiner is respectfully requested or for appeal.

Respectfully submitted,



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